The published version of this document can be found at
https://doi.org/10.1177/00343552231187587.

How Degree Major and Demographic Factors Influence Employment and Earnings for College Graduates with Visual Impairments

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Funding note: The contents of this manuscript were developed under a grant from the U.S. Department of Health and Human Services, NIDILRR grant 90RTEM0007. However, these contents do not necessarily represent the policy of the Department of Health and Human Services and should not indicate endorsement by the Federal Government.

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Abstract

The purpose of this study was to investigate predictors of employment and earnings for college graduates with visual impairments, with an emphasis on the impact of college degree major on these outcomes. We utilized American Community Survey data to conduct a multinomial logistic regression analysis predicting employment (full-time/full-year versus less than full-time/full-year and not working) and a multiple regression analysis predicting annual earnings. Our predictor variables included demographic factors previously related to employment outcomes plus 25 college degree majors. Degree majors explained little variance in employment and earnings, although several specific majors were associated with these outcomes. Five majors predicted both: Computer Science, Electrical Engineering, Nursing, Accounting, and Finance. Age, gender, race, receipt of Social Security benefits, additional disabilities, having an advanced degree, and class of worker (earnings model only) were stronger predictors of employment outcomes than degree major. Degree majors that had significant relationships with earnings and employment in our study generally coincide with those for the general population. Vocational rehabilitation counselors should inform their consumers with visual impairments who are pursuing a college degree of differences in earnings and employment rates based on degree major.

How Degree Major and Demographic Factors Influence Employment and Earnings for College Graduates with Visual Impairments

Persistent discrepancies in employment rates between Americans with visual impairments (e.g., blindness, low vision, and difficulty seeing even when wearing glasses) and the general U.S. population have been documented in the literature (McDonnall & Sui, 2019). Recent estimates from nationally-representative data provided further evidence of considerable gaps between working-age adults with visual impairments and adults without disabilities in employment (U.S. Census Bureau, 2020) and earnings (Erickson et al., 2022; McDonnall et al., 2022a). These gaps in employment rates and earnings were evident at all levels of education but were smaller at higher levels of education (McDonnall et al., 2022a; McDonnall & Tatch, 2021). Given that employment and earnings gaps still exist between college graduates with and without visual impairments, it is relevant to consider whether the degree major obtained may explain some of this discrepancy.

Although identifying predictors of employment outcomes for people with visual impairments has generated substantial research interest, particularly in recent years, degree major has not been considered. Findings from this body of literature have been summarized in systematic reviews focusing on transition-age youth (Lund & Cmar, 2020), working-age adults (Lund & Cmar, 2019a), transition-age youth and working-age adults (Goertz et al., 2010), and adult vocational rehabilitation (VR) consumers (Lund & Cmar, 2019b). Subsequent studies provided additional evidence for many predictors of employment outcomes documented in those reviews (McDonnall et al., 2023; McKnight et al., 2021; Zapata, 2022), but none focused specifically on college graduates. Most studies on this topic used a dichotomous indicator of employment status, although some used measures of job quality or earnings.

Various demographic, disability-related, and socioeconomic factors have been included in previous research on employment outcomes for people with visual impairments. Several studies documented negative associations between female gender and employment (Goertz et al., 2010; Lund & Cmar, 2019b, 2019a, 2020; McKnight et al., 2021), earnings (Bell & Mino, 2013; Estrada-Hernández, 2008), and job quality (McDonnall et al., 2023). Receipt of Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI) was negatively associated with employment in most prior studies (Lund & Cmar, 2019b, 2020; McKnight et al., 2021). Having a secondary disability was also a negative predictor of employment (Goertz et al., 2010; Lund & Cmar, 2019b, 2020; McKnight et al., 2021), but this relationship was less consistent (Lund & Cmar, 2019a). Moreover, SSI/SSDI receipt and having a secondary disability were negatively associated with job quality (McDonnall et al., 2023). Findings regarding race, ethnicity, age, and severity of visual impairment varied across studies, samples, and outcomes (Goertz et al., 2010; Lund & Cmar, 2019b, 2019a, 2020; McDonnall et al., 2023; Zapata, 2022).

The most well-documented predictors of employment outcomes for people with visual impairments are work experience and education. Work experience, including earnings or self-support at VR application, was a consistent, positive predictor of employment (Lund & Cmar, 2019b, 2019a, 2020), and it was positively associated with job quality (McDonnall et al., 2023). Higher educational attainment was positively associated with employment across numerous studies (Goertz et al., 2010; Lund & Cmar, 2019b, 2019a, 2020; Zapata, 2022), with effect sizes ranging from very small to large. Education also had positive relationships with earnings (Bell & Mino, 2013; Capella, 2001; Estrada-Hernández, 2008) and job quality (Cimera et al., 2015; McDonnall et al., 2023). Among VR consumers, receiving college or university training and obtaining an educational degree or certificate were positively associated with employment and

job quality (Capella-McDonnall, 2005; Cimera et al., 2015; McDonnall et al., 2023).

The employment rate for college graduates with visual impairments (62.5%) was substantially higher than the employment rates for working-age adults with visual impairments who had lower levels of education (i.e., 26.2% for less than a high school diploma, 37.0% for a high school diploma, and 46.2% for some college or an associate degree), but only a small proportion of adults with visual impairments had a college degree in 2017 (15.9% compared to 34.5% of adults without disabilities; McDonnall & Tatch, 2021). High school graduates with visual impairments in the United States had similar or higher rates of postsecondary school enrollment than the general population (McDonnall, 2010). However, research suggests that degree completion for college students with visual impairments lags behind the general population (Miller et al., 2020; Richardson & Roy, 2002; Schuck et al., 2019), as documented for students with all types of disabilities (Herbert et al., 2014). In the United Kingdom, college students with visual impairments were less likely to complete their degrees than students without disabilities (Richardson & Roy, 2002). In the United States, only 53% of college students with visual impairments obtained 30 credits (i.e., reached Sophomore status) up to 8 years after high school graduation (Schuck et al., 2019). In Texas, approximately 45% of college students with visual impairments obtained a Bachelor's degree within 7 years of initial college enrollment (Miller et al., 2020). Other research related to college students with visual impairments has focused on their experiences and what it takes for them to succeed in college (Correa-Torres et al., 2018; Hodges & Keller, 1999; Mask & Depountis, 2018; McBroom, 1997; Schuck et al., 2019; Vancil, 1997).

Despite ample evidence supporting the link between higher levels of education and better employment outcomes for people with visual impairments, a college education is not sufficient

for closing the employment gap for this population (McDonnall & Tatch, 2021). Still, factors associated with employment outcomes specifically for college graduates with visual impairments have received very little research attention. The few studies that focused on employment for college graduates with visual impairments had small samples and investigated the effects of social networks (Roy et al., 1998) and mentoring (Antonelli et al., 2018; O'Mally & Antonelli, 2016). Antonelli and colleagues (2018) found that college graduates encountered some of the common employment barriers documented for the broader population of people with visual impairments, including negative employer attitudes, transportation difficulties, and lack of job accommodations (Crudden & McBroom, 1999; McDonnall et al., 2013; Silverman et al., 2019). No studies have examined multiple predictors of employment or earnings in a national sample of college graduates with visual impairments.

Degree major is associated with employment and earnings for the general population (Bankrate, 2021; Carnevale et al., 2015; Ryan, 2012). For example, business majors and science, technology, engineering, and mathematics (STEM) majors had among the highest employment rates whereas education and art-related majors had among the lowest (Bankrate, 2021; Ryan, 2012). Most of the highest-paying majors for the general population were in STEM fields (primarily engineering), and the lowest-paying majors were in education and art-related fields (Bankrate, 2021; Carnevale et al., 2015; Ryan, 2012). An investigation of employment for recent college graduates with all types of disabilities also revealed some differences in employment rates by degree major (Kessler Foundation, 2020). Considering that people with disabilities have heterogeneous characteristics and needs, relationships between degree majors and employment outcomes likely differ across disability groups.

Visual impairment can impact the employment prospects of college graduates in unique

ways. Because visual impairment is a low-incidence disability, and a large proportion of people with visual impairments are out of the labor force (McDonnall & Sui, 2019), encountering employees with individuals with visual impairments at work is likely a rare occurrence. Most employers have little to no knowledge about how people with visual impairments can perform job tasks, which is associated with negative attitudes toward these individuals as employees (McDonnall et al., 2014; Mcdonnall & Cmar, 2022; McDonnall & Crudden, 2018). Furthermore, small business owners expressed more concern about hiring people with visual impairments than people with other disabilities (Chen et al., 2016). Although people with visual impairments can perform most jobs with low- or no-cost accommodations, employers often lack information about obtaining job accommodations for people with visual impairments (McDonnall et al., 2014) or believe that accommodations would be too expensive (Lynch, 2013). People who lost their vision after obtaining their college degree may also have negative attitudes and misconceptions about their employability, perhaps due to internalized stigma (Bulk et al., 2020), particularly if they have not received vision rehabilitation or vocational rehabilitation services. These issues may be especially impactful for people with visual impairments who have degrees in STEM or other fields in which employees with visual impairments are underrepresented. Investigating associations between college degree majors and employment outcomes for college graduates with visual impairments would provide insight into the employment and earnings discrepancies experienced by this unique population.

In response to the aforementioned gaps in the literature, we conducted a secondary analysis of national data to examine predictors of employment and earnings for college graduates with visual impairments, with an emphasis on degree major. We addressed the following research questions: (a) What factors are associated with employment outcomes for college

graduates with visual impairments? and (b) Are certain college degree majors more, or less, conducive to positive employment outcomes for graduates with visual impairments?

Method

To investigate our research questions, we conducted two statistical analyses: one with employment status as the outcome variable and one with earnings as the outcome variable.

Data Source and Sample

We utilized the person-level dataset from the 2015-2019 American Community Survey (ACS) 5-Year Public Use Microdata Sample (PUMS) to answer the above research questions. The ACS is an ongoing, nationally representative survey conducted by the U.S. Census Bureau that provides annual information about the U.S. population, covering such topics as employment, occupations, educational attainment, disability, and home ownership. The 5-year PUMS dataset includes five 1-year PUMS files, consisting of data for approximately 5% of the U.S. population (U.S. Census Bureau, 2021b). For this study, we identified individuals with visual impairments based on a response of "Yes" to the ACS question "Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?" We then narrowed the sample to people who had a college degree and were between the ages of 21 and 64. The final sample for the employment model included 29,714 individuals (weighted N = 592,293). The earnings model sample was further limited to only include individuals who were employed at any time during the previous 12 months. People who had earnings in the top 1% and bottom 1% were removed from the sample to eliminate major outliers. The final sample for the earnings model included 20,812 individuals (weighted N = 412,868). Sample demographics, overall and by employment status, are provided in Table 1.

Dependent Variables

Employment status included three categories (all related to the past 12 months): (a) employed full-time/full-year (FT/FY), (b) employed less than FT/FY, and (c) not employed. FT/FY employees were those who worked 35 hours or more per week and 50 to 52 weeks during the previous year. Approximately half of the sample worked FT/FY (49.9%), and 21.1% worked less than FT/FY.

Earnings was defined as individuals' total personal earnings in the past 12 months, which included income (wages, salary, commission, bonuses, and tips) from all jobs before deductions for taxes and self-employment income (the net income from one's own business(es), after business expenses). The inflation adjustment factor in the 2015-2019 ACS 5-Year PUMS was used to adjust earnings to reflect 2018 dollars, as recommended by the Census Bureau (U.S. Census Bureau, 2021a).

Independent Variables

We included demographic and socioeconomic characteristics in both the employment model and the earnings model. Age, a continuous variable, was centered based on the average age of the larger sample, and gender was a dichotomous variable (female = 1, male = 0). For the remaining dichotomous and dummy variables, a value of "1" indicating the person had that characteristic or the factor applied, and a "0" indicating the characteristic or factor did not apply. We included two dummy variables for race (i.e., Black race and other races), with White serving as the reference group. Ethnicity signified whether the person was of Spanish, Hispanic, or Latino origin. Additional disabilities indicated whether the individual had one or more secondary disabilities, such as hearing, cognitive, ambulatory, self-care, or independent living difficulties. Two variables associated with educational attainment were included in the models; the first specified whether the person had a double major (more than one bachelor's degree) and the

second indicated whether the person had an advanced degree (master's, doctoral, or professional). SSDI receipt indicated whether the person had received Social Security benefits during the past 12 months. ACS does not specify what type of Social Security benefits the person was receiving, so it is possible that some respondents between the ages of 62 and 64 could have been receiving early Social Security retirement benefits.

Three additional variables were included only in the earnings model. Class of worker indicates the type of ownership of the organization for which a person works, and includes four basic categories (U.S. Census Bureau, 2021b). Class of worker was measured with three dummy variables – private non-profit, government, and self-employment – with private for-profit, the most common class of worker, serving as the reference group. Employed less than FT/FY was a dichotomous variable, coded "0" for FT/FY employment and "1" for less than FT/FY employment. We also included one continuous control variable, state-level median annual earnings, to account for state-level differences.

Bachelor's degree majors were the key independent variables for the second research question. ACS recorded up to two bachelor's degree majors for college graduates. We first counted the frequencies of every degree major and identified the top 25 most common majors for people with visual impairments, which accounted for 63.1% of all degree majors possessed by the sample. The top 25 majors are listed in Tables 2 and 3, in order of frequency. Dichotomous variables were generated for these top 25 majors (1 = had the degree major, 0 = did not have the degree major) to include in the statistical analyses. People could have a value of "1" for one, two, or none of the degree major variables. Thus, the degree major variables compared employment status and earnings for people who had each major to people who had all other majors.

Data Analysis

Statistical analyses were performed with SAS 9.4 software. Descriptive statistics were calculated using PROC SURVEYMEANS for continuous variables and PROC SURVEYFREQ for categorical variables. We used PROC SURVEYLOGISTIC to build a multinomial logistic regression model to examine the relationship between employment status and the independent variables. We used PROC SURVEYREG to build a multiple regression model to explore the relationship between earnings and the independent variables. Both models were constructed in the same sequential way: we entered the demographic and socioeconomic characteristics to establish a baseline, then we added the 25 degree major variables to evaluate the amount of additional variance explained. We utilized an alpha level of .05 to determine statistical significance, but we also considered effect sizes (odds ratios for the employment model and βs for the earnings model) to evaluate practical significance given our large sample size. Personal weights available in the 2015-2019 ACS 5-year PUMS file were applied to all analyses to obtain nationally representative estimates and adjusted standard errors.

Results

Employment Model

The multinomial logistic regression model that included only demographic and socioeconomic predictors explained 32.2% of the variance in employment status, while the full model (with demographic/socioeconomic characteristics *and* degree majors) explained 32.7% of the variance in employment status. Because the values of the other independent variables did not change when we added the 25 degree majors to the model, we report only the results of the full model in Table 2. Working FT/FY served as the reference group for the model; thus, positive estimates for dichotomous variables indicate that people in the designated category (e.g., have additional disabilities) were more likely to either not be employed or to be working less than

FT/FY. For age, the only continuous variable, the positive estimate for the not employed category indicates that as age increases, college graduates are more likely not to be employed than to work FT/FY. The negative estimate for the less than FT/FY work category indicates that as age increases, college graduates with visual impairments are more likely to be employed FT/FY than to be employed less than FT/FY.

Women, minorities, people with additional disabilities, and recipients of SSDI (or early Social Security) benefits were significantly more likely to not be employed at all than to work FT/FY. College graduates with advanced degrees were significantly more likely to work FT/FY than to not be employed. The relationships were the same for the working less than FT/FY category (e.g., women were significantly more likely to work less than FT/FY than to work FT/FY), apart from Black race, for which there was not a significant difference. The effect sizes for the relationships observed were small for most variables, with two exceptions. Receipt of SSDI had a large effect on employment status, with SSDI recipients substantially more likely to work less than FT/FY or not work at all than to work FT/FY. Having an additional disability also had a medium-to-large effect, with people who reported additional disabilities being substantially more likely to not work at all than to work FT/FY.

The 25 degree majors accounted for less than 1% of the variance in employment status. Despite explaining very little variance, nine of the majors were associated with working FT/FY. College graduates with degrees in eight of the majors were more likely to work FT/FY compared to not working at all, working less than FT/FY, or both. Those majors were Computer Science, Electrical Engineering, Nursing, General Business, Accounting, Business Management & Administration, Marketing & Marketing Research, and Finance. One major – English Language & Literature – was associated with lower odds of working FT/FY. All effect sizes for significant

degree majors were small.

Earnings Model

The multiple regression model that included only demographic and socioeconomic predictors explained 21.4% of the variance in earnings, while the full model (with demographic/socioeconomic characteristics *and* degree majors) explained 22.2% of the variance in earnings. Because the values of the other independent variables did not change after adding the 25 degree majors to the model, we report only the results of the full model in Table 3. Two of the 14 demographic and socioeconomic variables were not significantly associated with earnings: having a double major and being self-employed (compared to working for a for-profit company). Two variables were associated with higher earnings: older age and having an advanced degree. The remaining 10 variables were associated with lower earnings. People who worked less than FT/FY earned substantially less than those who worked FT/FY– on average, they earned only 10.9% of what FT/FY workers earned.

Twelve of the 25 degree majors were significantly associated with earnings – six were associated with higher earnings and six were associated with lower earnings, compared to average earnings of college graduates with visual impairments. The difference in annual earnings by degree major was substantial in some cases. When controlling for the other variables in the model, estimates for higher earnings associated with significant degree majors ranged from $4,384 (Accounting) to $13,532 (Electrical Engineering), as reported in Table 3 (*B* values). Estimated lower earnings associated with significant degree majors had a slightly smaller range: $-4,709 (Criminal Justice & Fire Prevention) to $-10,940 (Fine Arts). Interestingly, five of the majors that provided higher earnings were also associated with greater odds of working FT/FY (i.e., Computer Science, Electrical Engineering, Nursing, Accounting, and Finance).

Discussion

We examined factors associated with employment and annual earnings for college graduates with visual impairments, with an emphasis on degree majors. This study is the first known investigation of degree majors and other predictors of employment outcomes specifically for college graduates with visual impairments. We used ACS data, which provided a large sample and facilitated the exploration of national trends for a low-incidence population. We found that degree major explained little variance in employment status or earnings of college graduates, whereas known predictors of employment for other populations of people with visual impairments explained a larger amount of variance in these outcomes. Despite the limited amount of variance explained by degree major, several majors predicted employment status, earnings, or both. Our findings contribute to the literature by documenting the value of specific degree majors for people with visual impairments and providing new insight into the complex relationship between education and employment outcomes for this population.

Nine of the 25 degree majors were significantly associated with odds of FT/FY employment, and 12 of the majors were significantly associated with earnings. The eight degree majors associated with higher odds of working FT/FY for people with visual impairments coincide with majors that had lower than average unemployment rates in 2019 (Bankrate, 2021). The five majors associated with both greater odds of working FT/FY and higher earnings were all ranked within the top 41 of the most valuable majors, based on earnings, unemployment rate, and percentage with advanced degrees (Bankrate, 2021). The majors associated with lower earnings in our models were also associated with lower earnings in the Bankrate study (2021). Degree majors that had a significant impact on earnings for people with visual impairments appear to generally coincide with those for the general population. Being aware of potential

differences in employment prospects and earnings based on degree field can assist people with visual impairments in making an informed choice when exploring career options and selecting a college major.

Of the eight degree majors that were associated with greater odds of FT/FY employment, five were in the business field: General Business, Accounting, Business Management & Administration, Marketing & Marketing Research, and Finance. This finding may imply that (actual and perceived) accessibility barriers are less prevalent in the business field compared to other fields, potentially leading to more people with visual impairments obtaining and retaining jobs in this field. Other possible interpretations are that opportunities for full-time, stable employment are more prevalent in the business field than in other fields, or that business degrees afford opportunities for a wide range of jobs or self-employment.

The findings from this study support and extend previous research on demographic, disability, and socioeconomic predictors of employment for people with visual impairments. We found that female gender, additional disabilities, SSDI receipt, and minority race are associated with lower odds of FT/FY employment for college graduates with visual impairments. Our results regarding gender, additional disabilities, and SSDI are consistent with previous literature (Goertz et al., 2010; Lund & Cmar, 2019b, 2020; McKnight et al., 2021); however, effect sizes varied across studies, which may relate to differences in data sources, samples, and outcome variables. Still, these findings support the pervasiveness of these variables as risk factors for employment for people with visual impairments, including college graduates. Race was not a significant predictor of employment in most prior studies (Lund & Cmar, 2019b, 2019a, 2020), but some researchers documented negative associations between minority race and competitive employment for VR consumers (Giesen & Cavenaugh, 2012, 2013; Steinman et al., 2013).

Our results support the associations between demographic variables (i.e., gender, additional disabilities, SSDI, race, and age) and earnings or job quality for people with visual impairments documented in earlier investigations (Bell & Mino, 2013; Capella, 2001; Estrada-Hernández, 2008; McDonnall et al., 2023). Our results also indicate that college graduates who worked for government or private non-profit organizations had significantly lower earnings than graduates employed by private for-profit companies, but earnings did not differ between self-employed and private for-profit workers. A comparison of self-employment to the other three class of worker categories revealed lower average earnings for self-employed people with disabilities (Gouskova, 2020). Another study that compared self-employment to other class of worker categories documented lower median earnings for self-employed men and women with visual impairments but higher average earnings for men with visual impairments (Authors, 2022). Several factors may explain these discrepant cross-study findings, such as the characteristics of the populations and variability in work hours and earnings.

The overall employment rate for college graduates with visual impairments in this study was 71.1%, and the FT/FY employment rate was 49.9%. Those employment rates are substantially higher than the employment rates for all working-age adults with visual impairments but lower than estimates for working-age adults without disabilities (Erickson et al., 2022). These findings correspond with research documenting a strong relationship between higher levels of education and employment for people with visual impairments and the persistent gaps in employment rates between people with and without visual impairments across education levels (McDonnall & Tatch, 2021). In the present study, having an advanced degree predicted both FT/FY employment and higher annual earnings of $16,310. Those findings, combined with the association between educational advancement and employment outcomes for VR consumers

(Capella-McDonnall, 2005; McDonnall et al., 2023), indicate the value of VR professionals supporting consumers with visual impairments in pursuing an advanced degree when feasible and appropriate for their employment goal. These results provide additional evidence of the link between higher educational attainment and better employment outcomes for people with visual impairments (Goertz et al., 2010; Lund & Cmar, 2019b, 2019a, 2020; McDonnall et al., 2023; Zapata, 2022).

Limitations

Despite this study's contributions to the literature on employment outcomes for college graduates with visual impairments, it has several limitations. First, ACS data were obtained through national surveys; therefore, inaccurate responses and self-report bias could have affected the precision of our estimates, particularly for earnings. Second, we used a broad question about self-reported blindness or serious difficulty seeing to identify respondents with visual impairments, which was the only vision-related information available in ACS. This question is used across several national surveys, but it does not correspond with the federal definition of legal blindness or provide information about severity of vision loss. Third, we could not determine whether respondents between the ages of 62 and 64 who reported receipt of Social Security benefits received SSDI or early retirement benefits. Fourth, we do not know if respondents earned their degrees before or after the onset of their visual impairment. Given the lack of research on this topic, we cannot determine whether that factor would have impacted our results; however, it would be an interesting avenue to explore in future studies. Finally, we did not consider whether respondents sought or had a job that corresponded to their degree major. Additional research is needed to examine the match between job and degree major and its association with employment outcomes for college graduates with visual impairments. It would

also be useful to investigate other potential predictors of employment outcomes for this population that were not included in this study, such as job title, geographical location, labor market conditions, and health.

Implications

Our findings support the value of bachelor's and advanced degrees for employment outcomes for people with visual impairments, and they also illustrate the difference in the value of some specific degree majors. VR counselors should inform their consumers who are pursuing a college education about the differences in employment and earnings associated with specific majors. Many consumers, particularly younger consumers, may not be aware of these differences. There are several resources available that provide detailed information about the benefits of various majors (Bankrate, 2021; Carnevale et al., 2015; Cooper, 2021). A website that allows exploration of study data is available for the Carnevale et al. (2015) study (https://cew.georgetown.edu/cew-reports/valueofcollegemajors/). Counselors should offer these resources to their consumers and be prepared to provide support for interpreting them while discussing consumers' interests and options. This information will help consumers who are pursuing college degrees to make an informed choice regarding their major. Our findings also provide strong support for allowing and encouraging consumers to pursue advanced degrees. The Workforce Innovation and Opportunity Act clearly supports pursuing an advanced degree as a viable use of VR funds, and such a degree may be particularly important for people with visual impairments.

Several factors known to be related to employment outcomes for all people with visual impairments were also related to outcomes for college graduates. Two of these factors – SSDI receipt and having additional disabilities – had strong relationships with employment and

earnings, and both were risk factors for negative outcomes. People with a college degree are generally less likely to be eligible for and receive SSDI (Social Security Administration, 2021), unless they meet the definition of legal blindness, which has an automatic assumption of eligibility. The 13.1% of our sample who received SSDI is lower, although not substantially lower, than the 19.8% found to receive it across the entire population of people with visual impairments (McDonnall et al., 2022b). SSDI recipients are much, much less likely to work than non-recipients, suggesting that they may profit from benefits counseling to ensure they are aware of the multiple incentives available to encourage beneficiaries to work.

Reasons for much lower employment rates and earnings for college graduates with additional disabilities are not clear; they may relate to discrimination, challenges with accommodation needs, or health problems associated with the other disabilities. Recent research has documented the key roles that poor health and additional disabilities play in being out of the labor force for people with visual impairments (Authors, 2022; Crudden & McKnight, 2022). Regardless of the reason, the finding suggests that VR consumers with visual impairments and additional disabilities may require extra assistance in obtaining employment. Counselors should be proactive in helping consumers who are pursuing a college degree prepare for their job search. For example, they can provide them with training on job search strategies and help them identify viable job opportunities that fit their skills and abilities. They can also encourage participation in internships (when available) and gaining work experience while in college, preferably related to their degree field. Counselors may need to take a more active role in the job search of consumers with visual impairments and additional disabilities by interacting with potential employers on their behalf. Having the first contact with the employer and providing information about accommodations and the assistance that VR can provide may pave the way for such an applicant

to be considered for employment.

Conclusion

We conducted a secondary analysis of 2015-2019 ACS data to determine the explanatory power of degree majors on employment outcomes for college graduates with visual impairments. Although several degree majors were associated with FT/FY employment and annual earnings, degree majors explained little variance in these outcomes. We found that demographic variables were stronger predictors of employment and earnings than degree majors. These findings add to the body of literature documenting barriers to and facilitators of employment for people with visual impairments and extend this work to individuals who have a college degree. Additional research with other data sources would provide further insight into other factors that contribute to employment outcomes for this population.

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Table 1

Descriptive Statistics for the Overall Sample and Employment Status Sub-Groups

Variable	Overall		Employed FT/FY		Employed less than FT/FY		Not Employed	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Age[a]	47.28	(0.09)	45.28	(0.13)	45.24	(0.19)	52.21	(0.18)
Gender								
Male	269,946	45.6	147,310	49.8	50,319	40.2	72,317	42.2
Female	322,347	54.4	148,384	50.2	74,759	59.8	99,204	57.8
Race								
White	426,395	72.0	216,804	73.3	90,155	72.1	119,436	69.6
Black	83,531	14.1	39,283	13.3	16,620	13.3	27,628	16.1
Other	82,367	13.9	39,607	13.4	18,303	14.6	24,457	14.3
Hispanic ethnicity	67,292	11.4	34,637	11.7	15,530	12.4	17,125	10.0
Additional disabilities	238,019	40.2	75,939	25.7	44,245	35.4	117,835	68.7
SSDI receipt	77,346	13.1	2,918	1.0	10,739	8.6	63,689	37.1

Double major	62,855	10.6	31,580	10.7	13,305	10.6	17,970	10.5
Advanced degree	197,788	33.4	105,462	35.7	42,055	33.6	50,271	29.3
Class of worker								
Private for-profit	223,634	53.1	158,431	53.6	65,203	52.1	N/A	
Private non-profit	54,857	13.0	38,510	13.0	16,347	13.1	N/A	
Government	101,149	24.0	75,304	25.5	25,845	20.7	N/A	
Self-employment	41,132	9.8	23,449	7.9	17,683	14.1	N/A	

Note. FT/FY = full-time/full-year; SSDI = Social Security Disability Insurance. Weighted frequencies by employment status: employed FT/FY, n = 295,694; employed less than FT/FY, n = 125,078; not employed, n = 171,521. All estimates are weighted to be nationally representative.

[a]Values are means and standard errors of means (in parenthesis).

Table 2

Results of Multinomial Logistic Regression Model Predicting Employment Status

Variable	*B*	*SE*	*t*	*p*	*OR*	95% CI
Not employed (reference = Employed FT/FY)						
Intercept	-1.98	0.06	-33.42	<.001		
Age (centered)	0.03	0.00	13.97	<.001	1.03	[1.03, 1.04]
Female	0.48	0.05	10.13	<.001	1.62	[1.48, 1.78]
Black race	0.23	0.06	3.65	.001	1.26	[1.11, 1.42]
Other race	0.43	0.06	7.11	<.001	1.54	[1.37, 1.74]
Hispanic ethnicity	0.01	0.07	0.22	.829	1.02	[0.89, 1.16]
Additional disabilities	1.50	0.04	34.89	<.001	4.47	[4.10, 4.87]
SSDI receipt	3.57	0.09	39.13	<.001	35.63	[29.71, 42.73]
Double major	0.02	0.07	0.36	.723	1.02	[0.90, 1.17]
Advanced degree	-0.38	0.05	-7.95	<.001	0.68	[0.62, 0.75]
Degree major[a]						
Business Management & Administration	-0.15	0.08	-2.00	.049	0.86	[0.74, 1.00]

Psychology	0.08	0.09	0.96	.342	1.09	[0.91, 1.29]
General Business	-0.17	0.11	-1.52	.133	0.84	[0.68, 1.05]
Nursing	-0.26	0.09	-2.76	.007	0.77	[0.64, 0.93]
General Education	0.14	0.10	1.43	.158	1.15	[0.95, 1.39]
Accounting	-0.27	0.11	-2.35	.021	0.77	[0.61, 0.96]
Elementary Education	0.06	0.10	0.56	.579	1.06	[0.87, 1.29]
English Language & Literature	0.30	0.13	2.32	.023	1.36	[1.04, 1.76]
Biology	0.14	0.12	1.14	.257	1.15	[0.90, 1.46]
Criminal Justice & Fire Protection	-0.04	0.12	-0.37	.711	0.96	[0.76, 1.21]
Political Science & Government	-0.24	0.14	-1.69	.095	0.79	[0.60, 1.04]
Communications	-0.32	0.14	-2.23	.029	0.73	[0.55, 0.97]
Computer Science	-0.40	0.14	-2.80	.006	0.67	[0.50, 0.89]
Marketing & Marketing Research	-0.20	0.15	-1.28	.204	0.82	[0.61, 1.12]
History	0.05	0.14	0.33	.743	1.05	[0.79, 1.40]
Social Work	-0.18	0.14	-1.25	.214	0.84	[0.63, 1.11]
Sociology	-0.20	0.15	-1.34	.185	0.82	[0.61, 1.10]

Finance	-0.51	0.16	-3.22	.002	0.60	[0.44, 0.82]
Economics	0.16	0.15	1.08	.283	1.18	[0.87, 1.58]
Fine Arts	0.11	0.17	0.62	.534	1.12	[0.79, 1.58]
Electrical Engineering	0.01	0.15	0.08	.940	1.01	[0.75, 1.36]
Liberal Arts	-0.02	0.15	-0.13	.894	0.98	[0.72, 1.33]
Mathematics	0.38	0.20	1.95	.055	1.47	[0.99, 2.17]
Commercial Art & Graphic Design	0.25	0.19	1.32	.190	1.28	[0.88, 1.87]
General Engineering	-0.01	0.21	-0.06	.956	0.99	[0.65, 1.51]
Employed less than FT/FY (reference = Employed FT/FY)						
Intercept	-1.18	0.04	-29.08	<.001		
Age (centered)	<-0.01	<0.01	-2.29	.025	1.00	[0.99, 1.00]
Female	0.39	0.04	10.29	<.001	1.48	[1.37, 1.59]
Black race	-0.01	0.06	-0.10	.923	0.99	[0.88, 1.12]
Other race	0.15	0.06	2.43	.017	1.16	[1.03, 1.31]
Hispanic ethnicity	0.06	0.06	1.01	.316	1.06	[0.95, 1.19]
Additional disabilities	0.42	0.04	10.92	<.001	1.52	[1.41, 1.64]

SSDI receipt	2.22	0.10	21.48	<.001	9.22	[7.5, 11.32]
Double major	0.04	0.06	0.68	.498	1.04	[0.92, 1.18]
Advanced degree	-0.11	0.04	-2.74	.008	0.90	[0.83, 0.97]
Degree major[a]						
Business Management & Administration	-0.22	0.07	-2.98	.004	0.80	[0.69, 0.93]
Psychology	0.01	0.08	0.19	.852	1.02	[0.87, 1.19]
General Business	-0.38	0.10	-3.65	.001	0.69	[0.56, 0.84]
Nursing	-0.21	0.09	-2.22	.029	0.81	[0.67, 0.98]
General Education	-0.11	0.08	-1.28	.203	0.90	[0.76, 1.06]
Accounting	-0.27	0.09	-3.10	.003	0.77	[0.64, 0.91]
Elementary Education	0.16	0.08	1.92	.059	1.17	[0.99, 1.38]
English Language & Literature	0.25	0.13	2.00	.049	1.29	[1.00, 1.66]
Biology	-0.07	0.11	-0.64	.522	0.93	[0.76, 1.15]
Criminal Justice & Fire Protection	-0.18	0.12	-1.48	.144	0.83	[0.65, 1.07]
Political Science & Government	-0.21	0.13	-1.62	.108	0.82	[0.63, 1.05]
Communications	-0.12	0.12	-0.96	.338	0.89	[0.70, 1.13]

Computer Science	-0.37	0.15	-2.38	.020	0.69	[0.51, 0.94]
Marketing & Marketing Research	-0.29	0.12	-2.44	.017	0.75	[0.59, 0.95]
History	-0.09	0.12	-0.80	.428	0.91	[0.72, 1.15]
Social Work	-0.04	0.15	-0.27	.790	0.96	[0.71, 1.30]
Sociology	-0.17	0.15	-1.08	.282	0.85	[0.62, 1.15]
Finance	-0.53	0.16	-3.36	.001	0.59	[0.43, 0.80]
Economics	0.09	0.15	0.60	.547	1.09	[0.82, 1.47]
Fine Arts	0.27	0.14	1.92	.059	1.31	[0.99, 1.74]
Electrical Engineering	-0.47	0.16	-2.97	.004	0.62	[0.45, 0.86]
Liberal Arts	0.04	0.16	0.26	.792	1.04	[0.76, 1.43]
Mathematics	0.13	0.19	0.71	.477	1.14	[0.79, 1.65]
Commercial Art & Graphic Design	0.28	0.20	1.41	.162	1.32	[0.89, 1.96]
General Engineering	-0.21	0.23	-0.90	.370	0.81	[0.51, 1.29]

Note. Weighted N = 592,293. CI = confidence interval; FT/FY = full-time/full-year; SSDI = Social Security Disability Insurance.

[a]Arranged from most to least common majors based on weighted estimates.

Table 3

Results of Multiple Regression Analysis Predicting Earnings

Variable	*B*	*SE (B)*	β	*t*	*p*
Intercept	46,646.58	4,140.29	0.00	11.27	<.001
Age (centered)	813.68	34.38	0.16	23.67	<.001
Female	-13,723.38	1,025.94	-0.11	-13.38	<.001
Black race	-11,764.57	988.14	-0.07	-11.91	<.001
Other race	-4,460.58	1,254.07	-0.03	-3.56	.001
Hispanic ethnicity	-9,848.92	1,179.87	-0.05	-8.35	<.001
Additional disabilities	-6,800.59	953.29	-0.05	-7.13	<.001
SSDI receipt	-22,673.66	2,164.59	-0.07	-10.47	<.001
Double major	-1,351.18	1,397.87	-0.01	-0.97	.337
Advanced degree	16,310.45	1,043.86	0.13	15.63	<.001
Employed less than FT/FY	-41,552.64	986.12	-0.32	-42.14	<.001
Class of worker (ref. group=Private for-profit)					
Private non-profit	-8,202.03	1,288.87	-0.05	-6.36	<.001
Government	-6,242.76	983.79	-0.04	-6.35	<.001
Self-employment	1,099.09	1,991.72	0.01	0.55	.583
Median state earnings	0.96	0.10	0.09	9.47	<.001
Degree major[a]					
Business Management & Administration	-784.40	1,841.51	0.00	-0.43	.671
Psychology	-4,996.98	1,869.86	-0.02	-2.67	.009

General Business	2,921.50	2,188.99	0.01	1.33	.186
Nursing	7,727.83	1,490.30	0.03	5.19	<.001
General Education	-7,527.38	2,211.18	-0.02	-3.40	.001
Accounting	4,384.02	1,931.13	0.01	2.27	.026
Elementary Education	-9,370.75	1,352.61	-0.03	-6.93	<.001
English Language & Literature	789.05	2,875.18	0.00	0.27	.785
Biology	11,545.83	2,892.58	0.03	3.99	<.001
Criminal Justice & Fire Protection	-4,708.55	2,250.79	-0.01	-2.09	.040
Political Science & Government	6,042.62	3,281.65	0.02	1.84	.069
Communications	-4,030.66	2,366.45	-0.01	-1.70	.092
Computer Science	10,392.46	2,691.48	0.03	3.86	<.001
Marketing & Marketing Research	5,340.27	3,388.43	0.01	1.58	.119
History	-1,331.28	3,328.02	0.00	-0.40	.690
Social Work	-8,282.32	2,270.32	-0.02	-3.65	.001
Sociology	-2,392.39	2,403.90	-0.01	-1.00	.323
Finance	7,247.52	3,624.01	0.02	2.00	.049
Economics	7,051.42	5,122.33	0.02	1.38	.173
Fine Arts	-10,939.86	3,010.22	-0.02	-3.63	.001
Electrical Engineering	13,531.68	4,359.49	0.03	3.10	.003
Liberal Arts	-3,012.22	3,609.50	-0.01	-0.83	.407
Mathematics	5,819.56	4,577.17	0.01	1.27	.207
Commercial Art & Graphic Design	-3,992.23	3,839.56	-0.01	-1.04	.302
General Engineering	6,711.15	6,193.90	0.01	1.08	.282

Note. Weighted *N* = 412,868. SSDI = Social Security Disability Insurance; FT/FY = full-time/full-year. *B* values represent the estimated difference in annual earnings based on the characteristic or degree major. [a]Arranged from most to least common majors based on weighted estimates.